

In the Drawings:

Please substitute the enclosed replacement drawing of Figure 4, which does not contain any new matter, for the original drawings of Figure 4 filed with the application. Marked up versions of the substitute drawings are no longer required pursuant the newly revised 37 C.F.R. § 1.121.

Remarks:

Applicant has studied the Office Action dated May 17, 2005, and has amended the claims to distinctively claim the subject matter of the invention. By virtue of this amendment, claims 1, 5-8, 16, 19 have been amended, claims 4, 9-15, 20 have been canceled.

New claims 21 and 22 are added. No new matter has been added, however. Support for the amendments is found within the specification and the drawings. It is submitted that the application, as amended, is in condition for allowance.

Drawings and Specification:

The Examiner objected to the drawings and the specification for inconsistencies between the numeral references in the specification and the elements disclosed in the figures and other typographical errors. A substitute specification is provided to amend the specification in compliance with the Examiner's suggestions. Therefore, it is respectfully requested that the respective objections to be withdrawn.

Claim Objections:

The Examiner objected to the claims for lack of connecting terms and other informalities. The claims have been amended to comply with the Examiner's suggestions. Therefore, it is respectfully requested that the respective objections to be withdrawn.

§112 Rejections:

The claims are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. Claims have been carefully reviewed and amended per Examiner's suggestions to correct all informalities and indefinite subject matter. As amended, the claims overcome the Examiner's rejection under section 112.

§103 Rejections:

Claims 1-4 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,673,293 (Scrapa). Claim 1 is amended to distinguish the recited invention from the cited prior art reference.

The present invention relates to a symbol timing recovery of a digital TV receiver. That is, the present invention is to stably recover symbol timing regardless of carrier recovery. To this end, the symbol timing recovery of the present invention converts VSB signals to OQAM signals, respectively squares the converted signals, adds the squared values to each other, and outputs the resultant values to a timing error detector.

In other words, as claimed, the symbol timing recovery of the present invention comprises an OQAM converter and filter converting for converting each of the digital base-band real/imaginary signals in a VSB type into OQAM real/imaginary component signals, and performing a high pass-band filtering on the OQAM real/imaginary component signals for removing information of data section. Also claimed is a squaring operator for squaring each of the OQAM real/imaginary component signals output from the OQAM converter and filter, and for adding and outputting the calculation. Another squarer is also claimed for squaring the signal output from the squaring operator and outputting the calculation to a timing error detector.

In contrast, Scrapa teaches a system for receiving all the signals *regardless* of VSB signals or QAM signals. Particularly, the system disclosed by Scrapa minimizes the amount of duplicated circuitry required for a joint VSB/QAM demodulator that can implement respective functions of a QAM demodulator and a VSB demodulator.

Although the cited reference discloses a timing recovery circuit provided with a timing recovery module, it fails to disclose detailed configuration and description of the timing recovery module. Particularly, the timing recovery module of the cited reference is not implemented to handle phase error of residual carrier of a carrier recovery module when the carrier recovery module does not completely implement this function.

To solve the above-noted problem, the present invention comprises an OQAM converter and filter, a squaring operator, and a squarer. However, the cited reference discloses neither the above elements nor suggests a solution to the above-mentioned problem.

Furthermore, in the present invention, VSB real/imaginary component signals modulated in a VSB mode are multiplied by the specific frequency to generate OQAM real/imaginary component signals. As claimed, the OQAM signals are generated based on the VSB signals. In contrast, QAM signals disclosed in the cited reference are modulated in a QAM mode and then transmitted. Therefore, the OQAM signals of the present invention are distinguishable from the QAM signals of the cited reference.

Allowable Subject Matter:

The applicant wishes to thank the Examiner for finding allowable subject matter in claims 12, 13, 18 and 19. The applicant respectfully submits that based on the present amendments and arguments provided above, the pending claims 1-3, 5-8, 16-19 and 21-22 recite a digital TV receiver that is distinguishable from the system of Scraper.

Particularly, Scraper fails to disclose or suggest a digital TV receiver including an A/D converter, a carrier recovery, and a symbol clock recovery, wherein the symbol clock recovery comprising an OQAM converter and filter for converting each of the digital base-band real/imaginary signals in a VSB type into OQAM real/imaginary component signals, and performing a high pass-band filtering on the OQAM real/imaginary component signals for removing information of data section; a squaring operator for squaring each of the OQAM real/imaginary component signals outputted from the OQAM converter and filter, and adding and outputting the calculation; a squarer for squaring the signal outputted from the squaring operator, and outputting the calculation for detecting timing error information; and a timing error detector and recovery for detecting timing error information from the squared signal outputted from the squarer, and generating and outputting at least two times the frequency of the symbol clock corrected from the detected timing error information.

As such independent claims 1, 16 and 21 substantially claiming all the above elements should be in condition for allowance, along with their respective dependent claims 2-3, 5-8, 17-19, and 22.

Double Patenting:

The Examiner has rejected claims 1- 9, 11, 14, 16 and 19 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 2, 4-9, 11, 12, 14, 15 of U.S. Application No. 10/761,754. The cited application and the present application are commonly owned by the Applicant.

In the interest of expediting prosecution of this application without prejudice, the applicant hereby submits a terminal disclaimer in compliance with 37 C.F.R. 1.321(c) to overcome this rejection. Therefore, it is respectfully requested that the rejection of claim 1- 9, 11, 14, 16 and 19 be withdrawn.

Conclusion:

By the virtue of this amendment all objections and rejections on the grounds of double patenting and section 112 and 103 are now overcome and all pending claims should be in condition for allowance.

No amendment made was related to the statutory requirements of patentability unless expressly stated herein; and no amendment made was for the purpose of narrowing the scope of any claim, unless Applicants have expressly argued herein that such amendment was made to distinguish over a particular reference or combination of references.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles, California,

telephone number (213) 623-2221 to discuss the steps necessary for placing the application in condition for allowance.

Respectfully submitted,
Lee, Hong, Degerman, Kang & Schmadeka

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Customer No. 35884

By: _____



F. Jason Far-hadian, Esq.
Registration No. 42,523
Attorney(s) for Applicant(s)

Lee, Hong, Degerman, Kang & Schmadeka
801 S. Figueroa Street, 14th Floor
Los Angeles, CA 90012
Telephone: (213) 623-2221
Facsimile: (213) 623-2211